

NOTE

Trichogramma Species (Hymenoptera: Trichogrammatidae) Egg Parasitoids of
Lepidoptera in the Eastern Mediterranean Region of Turkey

Trichogramma can parasitize a wide range of insects but mostly attack Lepidoptera, including a large number of important agricultural pests. However, worldwide commercial use of *Trichogramma* is still limited to a small number of species. For effective commercial use, it is essential to select suitable species to control the target insect pests. Success or failure in the use of egg parasites in biological control depends on the choice of species. Toward this goal, the species of *Trichogramma* not previously known and observed in Lepidoptera eggs, except those on corn, in the eastern Mediterranean region of Turkey were determined.

Surveys were carried out in cultivated areas [cotton (June–September), corn (April–October), citrus (April–June), wine (April–August), apple and the other fruits (May–September), vegetables and weeds (throughout the year)] and non-cultivated areas in Adana (35.16°E, 37.00°N), Mersin (34.36°E, 36.51°N), and Hatay (36.10°E, 36.14°N) provinces, in the eastern Mediterranean region of Turkey, during 2000–2001. Eggs of Lepidoptera on these crops were collected and placed in refrigerated plastic boxes to bring to the laboratory. Collections were labeled with date, place and name of host plant. Each sample was prepared and cultured at 25±1°C, 65±10% RH, and 16:8 L:D. Samples were controlled daily until adult emergence. Some of the *Trichogramma* adults were kept in 70% alcohol and the others kept dry. The dry samples were kept in 7 drops of glacial acetic acid and 5 drops of lactophenol or chloral-phenol in small petri dishes for 1–3 d, then specimens were mounted in hoyer's (Rosen and

DeBach 1979). Prepared samples were identified by a specialist.

Six species of *Trichogramma* were determined: *Trichogramma embryophagum* Hartig, *Trichogramma cacaoeciae* Marchal, *Trichogramma pintoii* Voegelé, *Trichogramma evanescens* Westwood (= *Trichogramma turkestanica* Meyer), *Trichogramma brassicae* (Bezdenko), and *Trichogramma dendrolimi* Matsumura (Table 1). The hosts of *Trichogramma* were determined as *Trichophusia ni* (Hübner) (Lepidoptera: Noctuidae) on lettuce, *Chrysodeixis chalcites* (Esper) (Lepidoptera: Noctuidae) on black nightshade, *Helicoverpa armigera* (Hübner) (Lepidoptera: Noctuidae) on cotton, tomato and cabbage, *Ostrinia nubilalis* (Hübner) (Lepidoptera: Crambidae) on corn, *Cydia pomonella* (L.) (Lepidoptera: Tortricidae) on apple, *Cydia molesta* (Busck) (Lepidoptera: Tortricidae) on peach, *Archips rosanus* (Linnaeus) (Lepidoptera: Tortricidae) on cherry, *Thaumetopoea pityocampa* (Denis and Schiffermüller) (Lepidoptera: Thaumetopoeidae) on pine, and *Idaea bractilineata* (Zeller) (Lepidoptera: Geometridae) on castor oil (Table 1). Parallel results also were obtained from Spain (Cabello-Garcia and Vargas-Piqueras 1985), Russia (Livshits and Mitrofanov 1986), Germany (Hassan 1989), Bulgaria (Tsankov et al. 1996; Karadjov 1996), Portugal (Silva et al. 1999), and Holland (Rijswijk et al. 2000).

Based on the 2000 and 2001 records, six *Trichogramma* species were found on 11 host plants and nine various Lepidoptera pests, and, except for corn, these species are new records in the Mediterranean region of Turkey. *Trichogramma*

Table 1. *Trichogramma* species and host records in the Eastern Mediterranean Region of Turkey in 2000–2001.

Place	Date	Host Plants	Lepidoptera Hosts	<i>Trichogramma</i> Species
Hatay	12.09.2001	<i>Zea mays</i>	<i>Ostrinia nubilalis</i>	<i>T. brassicae</i>
Hatay	21.04.2000	<i>Rucumis communis</i>	<i>Idaea bractilineata</i>	<i>T. brassicae</i>
Hatay	10.04.2001	<i>Rucumis communis</i>	<i>Idaea bractilineata</i>	<i>T. brassicae</i>
Mersin	16.06.2000	<i>Malus communis</i>	<i>Cydia pomonella</i>	<i>T. embryophagum</i>
Mersin	11.07.2000	<i>Malus communis</i>	<i>Cydia pomonella</i>	<i>T. embryophagum</i>
Mersin	21.06.2001	<i>Malus communis</i>	<i>Cydia pomonella</i>	<i>T. embryophagum</i>
Mersin	04.07.2001	<i>Malus communis</i>	<i>Cydia pomonella</i>	<i>T. embryophagum</i>
Mersin	30.06.2000	<i>Prunus persicae</i>	<i>Cydia molesta</i>	<i>T. embryophagum</i>
Mersin	16.06.2000	<i>Prunus avium</i>	<i>Archips rosanus</i>	<i>T. cacoeciae</i>
Adana	18.01.2001	<i>Lactuca sativa</i>	<i>Trichoplusia ni</i>	<i>T. pintoi</i>
Mersin	16.02.2000	<i>Solanum nigrum</i>	<i>Chrysodeixis chalcites</i>	<i>T. evanescens</i>
Mersin	15.02.2001	<i>Solanum nigrum</i>	<i>Chrysodeixis chalcites</i>	<i>T. evanescens</i>
Adana	02.08.2000	<i>Zea mays</i>	<i>Ostrinia nubilalis</i>	<i>T. evanescens</i>
Adana	03.08.2000	<i>Zea mays</i>	<i>Ostrinia nubilalis</i>	<i>T. evanescens</i>
Adana	09.08.2000	<i>Zea mays</i>	<i>Ostrinia nubilalis</i>	<i>T. evanescens</i>
Adana	14.08.2000	<i>Zea mays</i>	<i>Ostrinia nubilalis</i>	<i>T. evanescens</i>
Adana	24.08.2000	<i>Zea mays</i>	<i>Ostrinia nubilalis</i>	<i>T. evanescens</i>
Adana	31.08.2000	<i>Zea mays</i>	<i>Ostrinia nubilalis</i>	<i>T. evanescens</i>
Adana	08.08.2001	<i>Zea mays</i>	<i>Ostrinia nubilalis</i>	<i>T. evanescens</i>
Adana	23.08.2001	<i>Zea mays</i>	<i>Ostrinia nubilalis</i>	<i>T. evanescens</i>
Adana	05.09.2001	<i>Zea mays</i>	<i>Ostrinia nubilalis</i>	<i>T. evanescens</i>
Adana	18.09.2001	<i>Zea mays</i>	<i>Ostrinia nubilalis</i>	<i>T. evanescens</i>
Adana	26.09.2001	<i>Zea mays</i>	<i>Ostrinia nubilalis</i>	<i>T. evanescens</i>
Mersin	15.08.2000	<i>Zea mays</i>	<i>Ostrinia nubilalis</i>	<i>T. evanescens</i>
Mersin	28.08.2000	<i>Zea mays</i>	<i>Ostrinia nubilalis</i>	<i>T. evanescens</i>
Mersin	16.08.2001	<i>Zea mays</i>	<i>Ostrinia nubilalis</i>	<i>T. evanescens</i>
Adana	20.01.2000	<i>Brassica oleracea</i>	<i>Helicoverpa armigera</i>	<i>T. evanescens</i>
Adana	24.08.2000	<i>Gossypium</i> sp.	<i>Helicoverpa armigera</i>	<i>T. evanescens</i>
Adana	05.09.2001	<i>Solanum lycopersicum</i>	<i>Helicoverpa armigera</i>	<i>T. pintoi</i>
Adana	05.09.2001	<i>Pinus</i> sp.	<i>Thaumatopoea pityocampa</i>	<i>T. embryophagum</i>
Adana	18.09.2001	<i>Pinus</i> sp.	<i>Thaumatopoea pityocampa</i>	<i>T. embryophagum</i>
Adana	05.09.2001	<i>Pinus</i> sp.	<i>Thaumatopoea pityocampa</i>	<i>T. dendrolimi</i>
Adana	18.09.2001	<i>Pinus</i> sp.	<i>Thaumatopoea pityocampa</i>	<i>T. dendrolimi</i>
Adana	26.09.2001	<i>Pinus</i> sp.	<i>Thaumatopoea pityocampa</i>	<i>T. dendrolimi</i>

evanescens was the dominant species detected on three host plants (corn, cotton, and weed) in the eggs of *H. armigera*, *O. nubilalis* and *C. chalcites*. *Trichogramma evanescens* was reported from *Pieris rapae* (L.) (Lepidoptera: Pieridae), *O. nubilalis*, and *C. pomonella* eggs, and was the dominant species within the total of nine on corn, fruit, and vegetable (Uzun et al. 1996).

All species were recorded from more than a few eggs, but of 241 eggs of *H. armigera* collected on cotton, only 14 were parasitized by *T. evanescens*. However, in maize fields thousands of eggs were

collected and most of them were parasitized by *T. evanescens*. With regard to apple orchards, hundreds of eggs were parasitized by *T. embryophagum*. Only on pine and maize were two different species of *Trichogramma* determined. *Trichogramma cacoeciae* and *T. dendrolimi* were found only in one host, *T. embryophagum*, *T. pintoi*, and *T. brassicae* were found in two different hosts, and *T. evanescens* was found in three different hosts.

Specimens have been deposited in the insect museum unit of the Plant Protection Research Institute in Adana, Turkey.

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